

## PATENT CLAIMS

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1. Device for use with an inhaler, the inhaler comprising a body, an aerosol canister arranged in said body containing medicament, comprising a metered dose chamber and able to dispense a metered dose of said medicament, a nozzle in fluid communication with said canister, an opening for dispensing of said medicament in fluid communication with said nozzle, said device comprising means (34, 36, 42, 44, 46, 50, 52) for activating said canister to open and dispense said medicament in response to an airflow in the inhaler caused by inhalation of a user through said opening, return means (42, 46, 56, 58, 60) for deactivating said canister to close it, characterized in that said return means deactivates said canister when the airflow drops below a certain threshold value.
2. Device according to claim 1, characterized in that said return means deactivates said canister in response to ending and/or termination of inhalation.
3. Device according to claim 1 or 2, characterized in that said activating means comprises first spring means, hereafter named pressure spring means, for moving the canister relative the housing to vent the metered dose chamber and that said return means comprises second spring means, hereafter named return spring means, for moving the canister relative the housing to an unvented position against the force of the first spring means.
4. Device according to any of the preceding claims, characterized in that the activating means and return means of the device are operated when the canister is positioned with its outlet facing downwards in the inhaler.
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5. Device according to claim 4, characterized in that the metered dose chamber is refilled/recharged during deactivation of the canister.
- 5 6. Device according to claim 3, characterized in that said return spring means of the return means is activated by the user.
7. Device according to claim 3, characterized in that said activating means comprises a pressure means (34, 36, 38) in contact  
10 with the bottom of the canister, that the pressure spring means are arranged between the pressure means and the housing of the inhaler, holding means (46, 52) for holding said pressure means, thereby preventing said pressure spring means and pressure means to depress the canister, support means (50) for supporting said holding  
15 means in holding said pressure means, and release/return mechanism (46, 58, 60) which is activated in response to an airflow due to inhalation, whereby, upon activation, the support means releases said spacer means which in turn releases said pressure means and the canister is depressed.  
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8. Device according to claim 7, characterized in that the return spring means of the return means is arranged to said support means, whereby upon termination of inhalation, said release/return mechanism activates said second spring means to urge said support  
25 means in supporting contact with said spacer means, whereby said spacer means urges the pressure means to a position where the canister is no longer depressed.
9. <sup>ar</sup> Device according to any of the preceding claims, characterized in that it comprises detecting/monitoring means for detecting/monitoring the time between activation and deactivation of the canister.  
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10. Device for an inhaler according to claim 1, further comprising a drug delivery opening (220), compartment (212) containing medicament to be delivered, an energy system comprising actuating means (244, 274) capable of delivering a dose of medicament from the compartment and activating means (222, 226, 230, 236) capable of activating said actuating means, whereupon activation of the device a force/energy acting on the activating means is transmitted to the actuating means, whereby a dose of medicament is delivered through said drug delivery opening, characterized in that said energy system is divided in at least a first and a second energy system, the first energy system comprising said activating (222, 226) means and a release means (230, 236), said second energy system comprising said actuating means (244, 274) and a locking means (250, 260, 264, 268) arranged to the actuating means and capable of locking said actuating means in an energised state, wherein the systems, when the device is non-activated, are in no physical contact with each other, and wherein, upon activation of the activating means, the release means is moved into contact with, and moves, the locking means out of a locking position.

11. Device according to claim 10, characterized in that the actuating means and release means are designed and adapted such that the force/energy provided by the first energy system upon activation is substantially higher than the force/energy required for releasing the second energy system.

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12. Device according to any of the preceding claims 10-11, characterized in that the second energy system comprises a transmission, by which the force/energy required for releasing said locking means is substantially less than the forces/energy required for holding said actuating means in an energised state.

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13. Device according to any of the preceding claims 10-12, characterized in that the force/energy available from said first energy system is adapted such that it is substantially above the variations in force/energy requirements for activating the second energy system.

14. Device according to any of the preceding claims 10-13, characterized in that said first energy system is calibrated such that the activating means is activated at a predetermined threshold.

15. Device according to any of the preceding claims 10-14, characterized in that it is arranged in an inhaler, and that the activating means is arranged and adapted such that it is activated upon inhalation.

16. Device according to claim 10, characterized in that the activating means comprises a flap or vane arranged in said inhaler adjacent an air intake of said inhaler.

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17. Device according to any of the preceding claims 10-14, characterized in that it is arranged in a medical injection device, and is arranged and adapted such that the activating means comprises a user-operated means whereby, upon operation, the release means moves the locking means out of a locking position.

18. Medical distributor for distributing medicament to a patient comprising at least one device according to claim 10, characterized in that there are arranged several devices acting in sequence of each other, dependent or independent of each other.

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19. Medical distributor according to claim 18, characterized in that the activating means of one device is activated upon start of inhalation and in that the activating means of a second device is activated upon termination of inhalation.
- 5 20. Inhaler comprising a device according to claim 10.
21. Medical injector comprising a device according to claim 10.
- 10 22. Device for an inhaler (300), according to claim 1, further comprising an inhalation opening, a container containing medicament, an actuating means capable of delivering a dose of medicament from the container, a movement means (326) connected to the actuating means and arranged such in the inhaler that it is
- 15 moved by inhalation through the inhalation opening, characterized in that the movement means comprises at least one pivotably arranged member (326), whereby the at least one member is balanced such around its pivoting point (328) that forces acting on the at least one member during movement of the inhaler, causing
- 20 acceleration/retardation, do not affect the at least one member.
23. Device according to claim 22, characterized in that the movement means comprises a balancing means (332,362) arranged such to the at least one member that the forces acting on the at least
- 25 one member during said movement of the inhaler are balanced out by the balancing means.
- Subas 24. Device according to claim 22 or 23, characterized in that the moment of the balancing means is substantially the same as
- 30 the moment of the at least one member.

25. Device for an inhaler according to claim 1, further comprising a container (410) with medicament and means for activating said container (412, 416, 418, 424, 426, 429) for delivery of a dose of medicament, characterised in an adjusting means (440) arranged and designed such as to automatically adjust the contact point between said container and said activating means to accommodate for differences in container size.
26. Device according to claim 25 characterised in that the said differences comprise tolerance width variations of the canister and a certain type of canister as well as different canister sizes.
27. Device according to claim 25, characterised in that said activating means comprises spring means for moving said container upon delivery of dose, and that said adjusting means is able of adjusting said spring means into contact with said container.
28. Device according to claim 25, characterised in that said activating means comprises lever means.
29. Device according to claim 25, characterised in that said activating means comprises motor means.
30. Device according to claim 26, characterised in that said container is an aerosol-driven canister arranged with a dispensing device activated upon depression of said canister, that said activating means comprises pressure means pivotally arranged in said inhaler and acting on said canister, and that said adjustment means is able of moving said pivoting point in correspondence to the size of said canister.

31. Device according to claim 30, characterized in that said adjustment means locks said pivoting point upon activation of said pressure means to depress said canister.

5 32. Device for an inhaler according to claim 1, further comprising an air passage inside the inhaler, an opening (512, 544) intended for inhalation of medicament in fluid connection with said air passage, means for delivering a dose of medicament (514, 516, 522, 548, 550, 560) into said air passage, means for activating said dose delivering  
10 means (526, 528, 530, 552, 554, 556), wherein said activating means is activated by an air flow through said air passage, characterized in that the device comprises user operated safety means (534, 580) arranged and positioned such that it prevents activation of said activating means when the safety means is in a non-operated state.

15 33. Device according to claim 32, characterized in that said safety device comprises an auxiliary air passage in communication with the inhalation air passage and in communication with the outside of the inhaler via at least one  
20 opening, and user operated means for blocking said auxiliary air passage when an inhalation of medicament is to be performed.

34. Device according to claim 33, characterized in that the user operated means comprises parts of a hand of a user of the  
25 inhaler.

35. Device according to claim 34, characterized in that there are at least two openings and that they are arranged such on the inhaler that they cannot be reached by the fingers of a child's one  
30 hand.

36. Device according to claim 34, characterized in that there are at least two openings and that they are arranged such on the inhaler that they cannot be reached by the fingers of an adults one hand.

37. Device according to claim 34, characterized in that the size of the opening is such that a finger of a child cannot block the opening.

38. Device (611) for use with an inhaler (610), according to claim 1, further comprising a body, a supply of medicament (614), a metered dose compartment, an air passage with an opening for a patient to inhale through, means for delivering a metered dose from the metered dose compartment during inhalation and a mouthpiece (618), wherein the mouthpiece is provided with a front end (622) to be placed in the patients mouth and is in fluid contact with said opening, characterized in means (624, 634) for moving the mouthpiece from a rest/protected position where the mouthpiece is arranged substantially within said body to an activated/inhaling position where at least the front end of the mouthpiece protrudes from the body of the inhaler.

39. Device according to claim 38, characterized in that it further comprises releasable fixating means (626, 640) for releasably fixating the mouthpiece in the two positions.

40. Device according to claim 39, characterized in that the fixating means comprises spring means for urging said mouthpiece to the activated position.



*Sub a6* 41. ~~Device according to claim 39 or 40, characterized in that the fixating means comprises a protective cover/lid (628) for holding said mouthpiece in the resting position.~~

5 42. Device according to claim 38, characterized in that the means for moving said mouthpiece comprises a pivot axis (624) arranged between the mouthpiece and the inhaler, for enabling a pivoting action between the resting and activated positions.

10 43. Device according to claim 38, characterized in that the means for moving said mouthpiece comprises guide means (634) for sliding the mouthpiece along its longitudinal direction when it is moved from resting position to activated position.

15 44. Device according to claim 41, characterized in that it further comprises activating means to set the inhaler ready for delivery of a subsequent dose and that the activating means are handled by the protective cover/lid.

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